REMARKS

Rejection of Claims and Traversal Thereof

In the February 17, 2009 Office Action:

claim 33 was rejected under 35 U.S.C. §102(e) as being anticipated by Balloul et al. (US Patent No. 7,354,591, hereinafter Balloul);

claims 34, 35, 38, 40 and 48 were rejected under 35 U.S.C. §102(e) as being anticipated by Balloul;

claims 37 and 39 were rejected under 35 U.S.C. §103(a) as being unpatentable over Balloul as applied to claim 34 and in further view of Harris, et al. (International Immunology, 1997, Vol 9, p 273-280); and

claims 27 and 30-32 were rejected under 35 U.S.C. §103(a) as being unpatentable over Balloul as applied to claim 34 and in further view of Chapman et al. (US Patent No. 6,232,099; hereinafter, Chapman).

These rejections are hereby traversed and reconsideration of the patentability of the pending claims is therefore requested in light of the following remarks.

Rejections under 35 U.S.C. §102(e)

I. Claim 33 was rejected under 35 U.S.C. §102(e) as being anticipated by Balloul. Applicants insist that Balloul is not an anticipatory reference and does not defeat the patentability of the claimed invention.

Applicants' claim 27 recites:

> 27. A method of producing a construct comprising a recombinant virus-like particle that infects a host organism for expression of the VLP and a first and second exogenous protein in the host organism and the exogenous proteins target specific tissue in a target animal, the method comprising:
>
> (a) providing a viral genome that infects the host organism wherein the host organism is yeast, bacteria, algae or an animal;

(b) isolating at least one viral coat protein sequence from the viral genome that encodes for a capsid structure;
(c) inserting at least one first exogenous sequence encoding a protein or peptide of interest into the coat protein sequences, wherein the protein or peptide is antigenic or allergenic in the target animal;
(d) inserting at least one second exogenous sequence encoding a tissue-targeting protein sequence in the animal into the coat protein sequences, wherein the expressed targeting protein has affinity for a receptor on tissue in the target animal;
(e) cloning the viral coat protein sequences comprising the first and second exogenous sequences into an appropriate vector for infection of the host organism; and
(f) transforming the host organism for expression of the recombinant virus-like particle and exogenous peptides or proteins therein, wherein the host organism and target animal are not the same.

Claim 33 recites:

A recombinant virus-like particle produced by the method of claims 27, 30, 31, or 32.

Anticipation under 35 U.S.C. § 102 requires the presence in a single reference of each and every element of the claimed invention, **arranged as in the claim**. *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 221 USPQ 481, 485 (Fed. Cir. 1984) (emphasis added)

Applicants insist that the Balloul reference does not in any way disclose, teach or suggest the presently claimed invention. Reviewing claim 27 it is evident that the construct provides for infecting a host organism for expression of a VLP therein along with additional proteins that will be effective in an entirely different target animal. Reduced to the basics and in simplistic terms the present invention provides for two recipients, the first recipient is a host organism that is infected with the virus and expresses the exogenous proteins and then this first recipient is administered to a second recipient wherein the proteins are effective. Notably the first and second recipients are not the same animal.

The Balloul reference only provides for a single recipient that is infected and then the expressed proteins are effective in the first recipient. Thus, Balloul does not anticipate the present invention as claimed in claim 33 and applicants request that this rejection under section 102 be withdrawn.

II. Claims 34, 35, 38, 40 and 48 were also rejected under 35 U.S.C. §102(e) as being anticipated by Balloul. Again it is evident that the Balloul reference only provides for a construct that includes sequences for expressed proteins that are effective in only the first recipient. Thus, Balloul does not

anticipate the present invention as claimed in claim 34 and claims depending therefrom. Applicants request that this rejection under section 102 be withdrawn.

Rejections under 35 U.S.C. §103(a)

III. Claims 37 and 39 were rejected under 35 U.S.C. §103(a) as being unpatentable over Balloul as applied to claim 34 and in further view of Harris. Applicants insist that the proposed combination does not in any way render the presently claimed invention as obvious.

Clearly, the Balloul reference does not in any way disclose, teach or suggest all the claimed elements of the present invention as described above, and the addition of Harris does not rectify the shortcomings of Balloul. Harris, teaches the use of the retrotransposon, Ty, which encodes proteins that are assembled into virus-like particles and carrying the sequences of the der p1 antigen which is known for causing an allergenic immune response. Harris introduces the retrotransposon into a mouse (first recipient) and watches for an immune response in the mouse. Thus, the host organism (first recipient) is affected because the proteins are tailor made for the host organism and certainly not for a separate and distinct target animal. In the present invention, the proteins are tailor made for the target animal and expression is completed in the host organism which is then administered to a target animal (second recipient). Applicants realize that this distinction is very subtle but still provides for patentable subject matter.

Thus, the proposed combination of Balloul and Harris does not disclose, teach or suggest all the claimed limitations of the presently claimed invention. In light of the above discussion, applicants submit that the Office has not established a *prima facie* case of obviousness, and as such, applicants respectfully request that the rejection under 35 U.S.C. §103(a) be withdrawn.

IV. Claims 27 and 30-32 were rejected under 35 U.S.C. §103(a) as being unpatentable over Balloul as applied to claim 34 and in further view of Chapman et al. (US Patent No. 6,232,099; hereinafter, Chapman). Applicants submit that the cited references either alone or in combination do not render the presently claimed invention as obvious.

As has already been noted, the Balloul reference does not in any way disclose, teach or suggest all the claimed elements of the presently claimed invention and the addition of Chapman, et al. does not provide any additional teachings or suggestions for going in the direction of applicants' claimed

invention. Chapman discloses a method of producing a chimeric protein, for example, a biologically active protein such as an antibiotic peptide. Chapman discloses "a method of producing a chimeric protein... wherein the protein derived from the second portion is purified directly from the host cell after expression" (column 3, lines 62-65). In other words, Chapman simply teaches a protein expression system, from which the protein is extracted and purified after expression. Clearly, there is no teaching or discussion in Chapman of using the host organism (first recipient) for delivery into a second recipient wherein any expressed proteins would be effective.

Notably reviewing Figure 1 of the present invention, it is evident that a host organism (yeast) includes the expressed proteins and then this host organism is administered to a target animal which provides for freeing thee VLP and with binding of the proteins at receptors in the target animal. Applicants note that yeast carrying the expressed package is very different from the target animal having an intestinal wall.

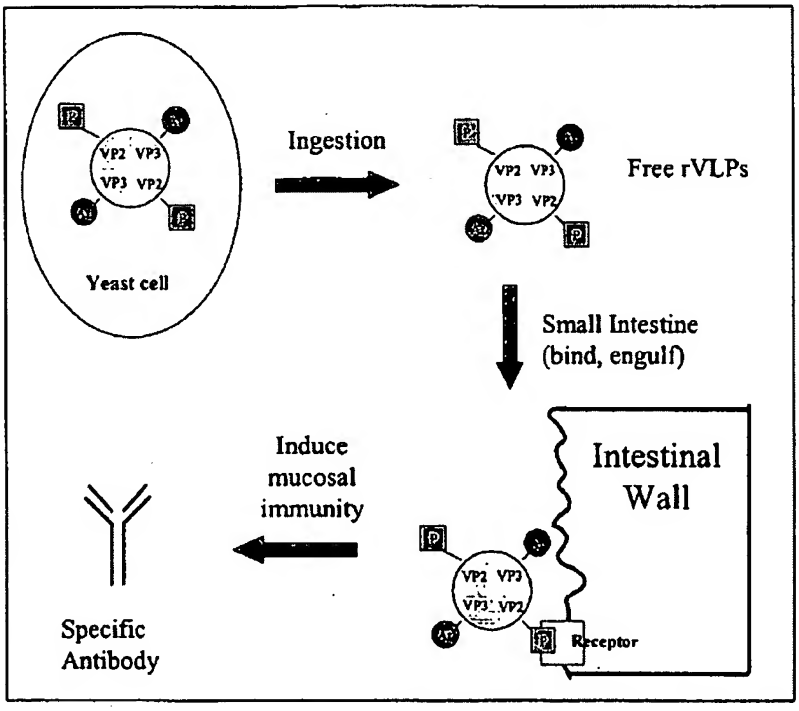

FIGURE 1

There is also the complication that Chapman teaches the use of benign high copy number rod-shaped viruses, such as potato virus (PVX) (a class IV single-stranded RNA virus) within the host cells taught therein and Balloul teaches the use of poxviruses (class I, double-stranded DNA viruses).

The Office does not explain how one of skill in the art would be able to combine the references in order to reach the presently claimed invention. Would the poxvirus of Balloul be transformed into a yeast, plant or bacterial host cell of Chapman? There is absolutely no indication that the large, complex poxviruses taught in Balloul could successfully be transformed into the host cells of Chapman, resulting in functional expression of the recombinant protein for extraction and purification as taught by Chapman. For example, there is no indication that the yeast, plant, or bacterial host cell of Chapman would take up the poxvirus of Balloul; there is no indication that the host cell of Chapman could propagate the poxvirus of Balloul. Further, there is no indication whether, if the poxvirus of Balloul grew and propagated in the host cell of Chapman, the proteins would be expressed; and there is no indication that if the proteins were expressed, they would fold properly and be functional. Thus, there is uncertainty at every step of a possible combination of the two references.

In responding to the all of the claim rejections under section 103, applicants remind the Office that **"[f]ocusing on the obviousness of substitution and differences instead of on the invention as a whole...[i]s a legally improper way to simplify the difficult determination of obviousness"** (*Hybritech, Inc. v. Monoclonal Antibodies*; Inc, 802 F.2d 1367, 231 USPQ 81 (Fed. Circ. 1986); emphasis added). The invention described herein, in its entirety, involves complex biotechnological procedures. In *Hybritech*, which also involved complex biotechnological procedures, the court recognized that it was improper to simplify the components of the invention in an attempt to piece together the invention from the prior art. "The question is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious." *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *Schenck v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983).

In light of the above discussion, applicants submit that the Office has failed to put forth a *prima facie* case of obviousness and request that all rejections be withdrawn.

Rejoining of Withdrawn Claims

Applicants request that method claims 41 to 47 be rejoined when the product claims are found allowable.

Fees payable

It is believed that no fees are due at this time. However, if a fee is found due, the Commissioner is hereby authorized to charge any deficiencies, or reimburse any over-charges, to Deposit Account No. 13-4365 of Moore & Van Allen, PLLC.

Conclusion

Applicants have satisfied the requirements for patentability. All pending claims are free of the art and fully comply with the requirements of 35 U.S.C. §112. It therefore is requested that Examiner Boesen reconsider the patentability of the pending in light of the distinguishing remarks herein, and withdraw all rejections, thereby placing the application in condition for allowance. Notice of the same is earnestly solicited. In the event that any issues remain, Examiner Boesen is requested to contact the undersigned attorney at (919) 286-8089 to resolve same.

Respectfully submitted,

Marianne Fuierer

Marianne Fuierer
Reg. No 39983
Attorney for Applicants

Deborah H. Spencer

Deborah H. Spencer
Reg. No. 50,468
Attorney for Applicants

Moore & Van Allen, PLLC
Telephone: (919) 286-8000
Facsimile: (919) 286-8199